



Western Road Map Implementation Plan, 2018-2022 Review Draft

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West Coast Region
Northwest Fisheries Science Center
Southwest Fisheries Science Center



11/16

NMFSI 01-120-01 November 16, 2016

Department of Commerce · National Oceanic & Atmospheric Administration · National Marine Fisheries Service

Each NOAA Fisheries region . . . will combine ongoing facets of National Climate Science Strategy Regional Action Plans, Next Generation Stock Assessment Priorities, Habitat Assessment Improvement Plan, Essential Fish Habitat Reviews, NOAA's Water Initiative, and specific systematic EBFM elements noted herein, into a **regional EBFM implementation plan** with specific milestones.



EBFMA Core Principles

6. Maintain Resilient
Marine Ecosystems

5. Incorporate ecosystem considerations
into management advice

4. Explore and address trade-offs within an
ecosystem

3. Prioritize vulnerabilities and risks of ecosystems and their
components

2. Advance our understanding of ecosystem processes

1. Implement ecosystem-level planning

***Guiding Principle 1:
Implement ecosystem-
level planning***



NOAA Fisheries supports the use of FEPs . . . to describe and integrate ecosystem objectives, and priorities for fisheries and ecosystem research, conservation, and management across multiple fisheries within an ecosystem.

**PACIFIC COAST
FISHERY ECOSYSTEM PLAN**

**FOR THE U.S. PORTION OF THE
CALIFORNIA CURRENT LARGE MARINE ECOSYSTEM**

**PACIFIC FISHERY MANAGEMENT COUNCIL
7700 NE AMBASSADOR PLACE, SUITE 101
PORTLAND, OR 97220
(503) 820-2280
(866) 806-7204
WWW.PCOUNCIL.ORG
JULY 2013**

Guiding Principle 2: Advance our understanding of ecosystem processes

NOAA Fisheries shall work to better understand the broader suite of ecosystem processes, drivers, threats, status and trends of the nation's marine ecosystems to inform all levels of management advice.



Agenda Item F.1.a
NMFS Report 1
March 2018

CALIFORNIA CURRENT INTEGRATED ECOSYSTEM ASSESSMENT (CCIEA) CALIFORNIA CURRENT ECOSYSTEM STATUS REPORT, 2018

A report of the NOAA CCIEA Team to the Pacific Fishery Management Council, March 9, 2018.

*Editors: Dr. Chris Harvey (NWFSC), Dr. Toby Garfield (SWFSC), Mr. Greg Williams (PSMFC),
Dr. Nick Tolimieri (NWFSC), and Dr. Elliott Hazen (SWFSC)*

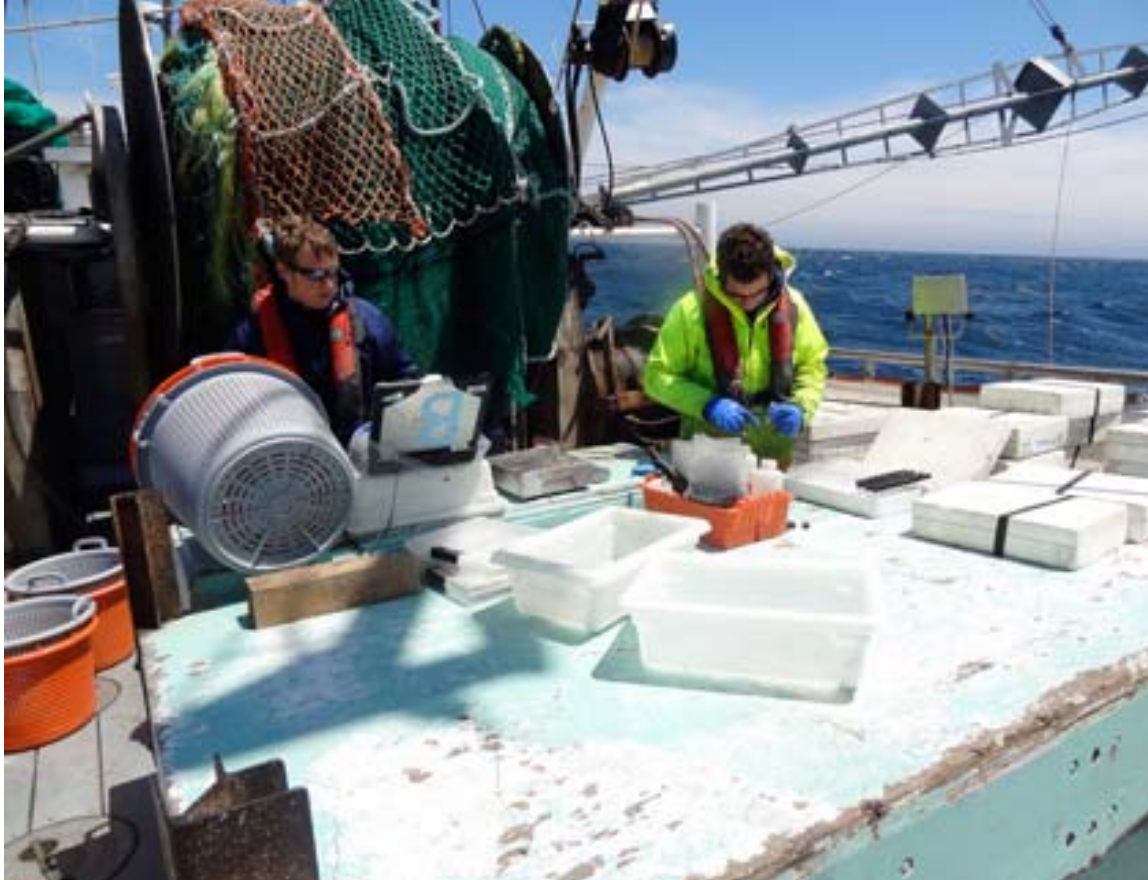
1 INTRODUCTION

Section 1.4 of the 2013 Fishery Ecosystem Plan (FEP) established a reporting process wherein NOAA provides the Council with a yearly update on the state of the California Current Ecosystem (CCE), as derived from environmental, biological and socio-economic indicators. NOAA's California Current Integrated Ecosystem Assessment (CCIEA) team is responsible for this report. This marks our 6th report, with prior reports in 2012 and 2014-2017.

The highlights of this report are summarized in Box 1.1. Sections below provide greater detail. In addition, Supplemental Materials are provided at the end of this document, in response to previous requests from Council members or the Scientific and Statistical Committee (SSC) to provide additional information, or to clarify details found within this report.

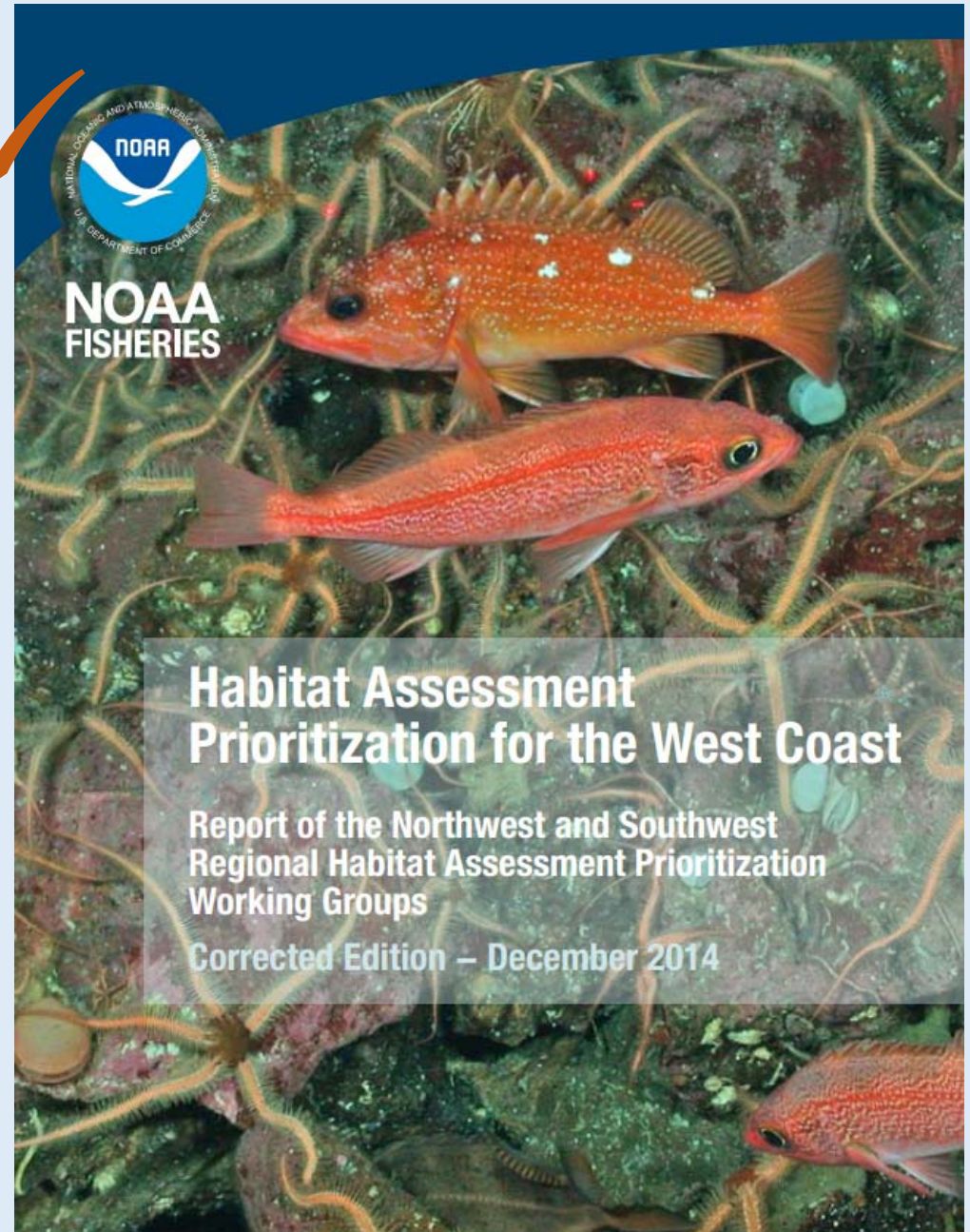
Box 1.1: Highlights of this report

- **Climate, oceanographic and streamflow indicators suggest that the physical system is transitioning toward average or even La Niña conditions, following the marine heat wave ("Blob") and major El Niño events of 2014-2016**
- **Several ecological indicators in 2017 also point toward more average conditions:**
 - The copepod community off Newport saw an increase in cool-water, lipid-rich species that are better for production of salmon
 - Some important forage species increased in the central and southern CCE
 - Sea lion pup growth at San Miguel Island was normal
 - There were no mass seabird mortality events
- **However, there was lingering evidence of unfavorable conditions in 2017:**
 - Persistent deep warm water remains in the northern portion of the system
 - Pyrosomes (warm-water salps) were extremely abundant in the northern and central CCE
 - Juvenile salmon catches were poor, and other indicators suggest that Chinook and coho salmon returns to the Columbia Basin will be below average in 2018
 - A major hypoxic event occurred on the shelf of the northern CCE in August-September
 - Reports of whale entanglements in fixed fishing gear were high for the fourth straight year; most reports involved crab gear, but some involved sablefish gear
- **For the first time, the report includes highly migratory species indicators, related to biomass, recruitment, and management of protected species bycatch**
- **Social vulnerability can now be compared with the dependence of coastal communities on commercial fishing and on recreational fishing**
- **We find some evidence of threshold relationships (between sea lions and upwelling), but no support yet for an "early warning index" of major ecosystem state changes**



***Guiding Principle 3:
Prioritize vulnerabilities
and risks to ecosystems
and their components***

NOAA Fisheries should evaluate and address the individual and cumulative drivers for the physical, chemical, biological, social, and economic components of marine ecosystems.



Species-Level CVA Results

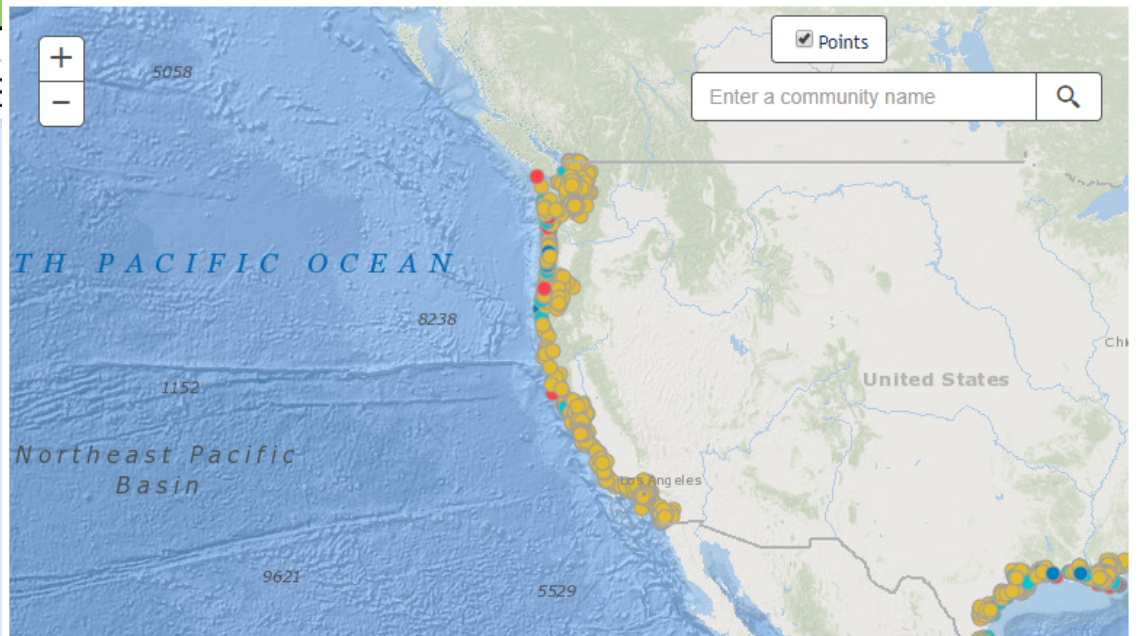
Biological Sensitivity	Very High			1 salmon 1 Other anadromous 1 Puget Sound rockfish	
				2 Puget Sound rockfish 5 Rockfish 1 HMS 4 salmon 1 Elasmobranch	
	Moderate		1 Elasmobranch 1 Other Groundfish	15 Rockfish 4 HMS 3 Other groundfish 1 Other anadromous 2 CPS 1 Flatfish	
	Low		2 Flatfish 1 Other Groundfish	5 HMS 4 flatfish	
		Low	Moderate		

MAPPING SOCIAL VULNERABILITY

Click a community point or enter a community point indicator on the map. For more on the indicator, see the Social Vulnerability Index (SVI) User Guide.

MAPPING SOCIAL VULNERABILITY

Click a community point or enter a community name to display its indicators. Click an indicator radio button to display a different indicator on the map. For more on the indicators, go to the [home page](#), [indicator definitions](#) or [supporting information](#).



Guiding Principle 4: Explore and assess trade-offs within an ecosystem

NOAA Fisheries supports the consideration of an efforts to take into account various trade-offs when considering the cumulative effects of decision making processes on the ecosystem.



Informational Report 5
September 2018

FUTURE SEAS MSE WORKSHOP REPORT

Management Strategy Evaluation (MSE) Workshop for the NOAA OAR/NMFS Project “Future Climate Change and the California Current (Future Seas) - A Physics to Fisheries Management Strategy Evaluation”

March 28, 2018
Scripps Seaside Forum
University of California San Diego, La Jolla, CA

Prepared by Desiree Tommasi, Michael Jacox, Barbara Muhling, James Smith, Steven Stohs,
and Jonathan Sweeney

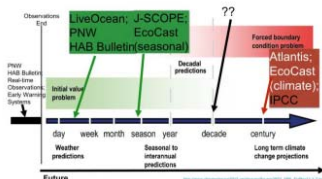
Summary

A one-day management strategy evaluation (MSE) workshop in support of the NOAA funded Future Seas project was held March 28, 2018 in La Jolla, CA. Attendees included academic and government scientists as well as representatives of federal agencies (NMFS West Coast Regional Office; Pacific Fisheries Management Council), state agencies (California and Oregon Departments of Fish and Wildlife), non-governmental organizations (Monterey Bay Aquarium, Ocean Conservancy, Pew Charitable Trusts, Wild Oceans), and the sardine, swordfish, and albacore fishers (including the American Albacore Fishing Association, Western Fishboat Owners Association, and the American Fishermen's Research Foundation). The workshop began with an overview of the oceanography of the California Current followed by an introduction to the Future Seas project, including objectives, timelines, and deliverables. The bulk of the day was dedicated to discussions of issues surrounding each of three U.S. west coast fisheries – albacore tuna, sardine, and swordfish. The discussion was lively and productive and is detailed in this report. With input from all represented stakeholders, we were able to synthesize for each fishery the key management objectives, stakeholder priorities, performance metrics, and management strategies. These findings will guide the development and execution of the project and ensure that it addresses the concerns of stakeholders. While issues surrounding management of these fisheries can be contentious, attendees expressed appreciation for being involved in the early stages of the project and interest in follow-up workshops in the coming years.

Introduction

Management strategy evaluation (MSE) is a risk management tool used by fisheries scientists to assess, using computer simulations, the ability of different management rules to achieve specific management objectives. The project “Future Climate Change and the California Current (Future Seas) - a Physics to Fisheries Management Strategy Evaluation” led by scientists from both academia and NOAA was recently funded by NOAA's Climate Program Office (CPO) to conduct MSEs for sardine, albacore, and swordfish fisheries in the California Current. The primary objectives of this workshop were to (i) inform stakeholders of the project's objectives, methodology, proposed output, and timelines, and (ii) work together with stakeholders to identify management objectives, performance metrics, and potential management strategies for the three fisheries to be evaluated under this project. The purpose of this report is to document the discussions of proposed management objectives, performance metrics, and management strategies.

THE STATE OF THE ART FOR ECOLOGICAL FORECASTING AT SHORT-, MEDIUM- AND LONG-TERM TIME FRAMES



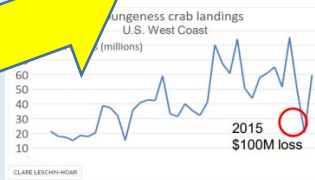
Isaac Kaplan¹, Vera Trainer¹, Michael Jacox², Samantha Siedlecki³
¹NOAA Northwest Fisheries Science Center
²NOAA Southwest Fisheries Science Center
³University of Connecticut



State of the Art for Ecological Forecasting at Short-, Medium- and Long-term Time Frames | February 1, 2018

2015 *Pseudo-nitzschia* bloom impacts

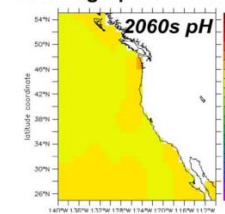
Shellfish closures, mammal deaths



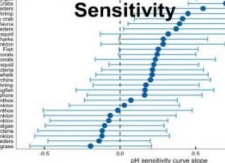
The State of the Art for Ecological Forecasting at Short-, Medium- and Long-term Time Frames | February 1, 2018

Approach: Ecosystem projections under scenarios for oceanography and pH sensitivity

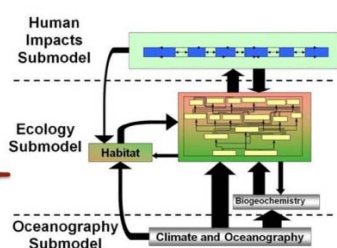
Oceanographic Model



Literature Review of pH Sensitivity



Atlantis Ecosystem Model

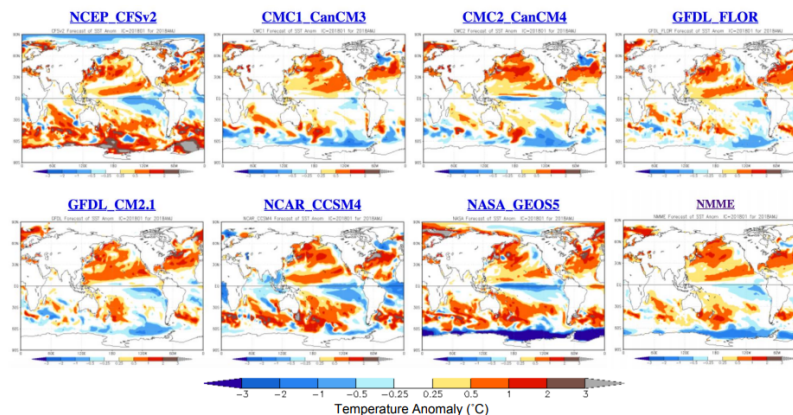


D.S. Busch and P. McElhany 2016 PLoS One
 K.N. Marshall et al. (2017) Global Change Bio



The State of the Art for Ecological Forecasting at Short-, Medium- and Long-term Time Frames | February 1, 2018

January Forecasts of Spring (April-May-June) Sea Surface Temperature



http://www.cpc.ncep.noaa.gov/products/NMME/current/tmpsfsc_Seas3.html



The State of the Art for Ecological Forecasting at Short-, Medium- and Long-term Time Frames | February 1, 2018

***Guiding Principle 5:
Incorporate ecosystem
considerations into
management advice***

NOAA Fisheries recognizes the value of placing its resource management efforts into a broader ecosystem context. Living resource management should consider best available ecosystem science in decision-making processes.



TERMS OF REFERENCE

FOR THE

METHODOLOGY REVIEW PROCESS
FOR GROUND FISH AND COASTAL
PELAGIC SPECIES FOR 2019-2020



JUNE 2018

CALIFORNIA CURRENT INTEGRATED ECOSYSTEM ASSESSMENT CALIFORNIA CURRENT ECOSYSTEM ASSESSMENT

A report of the NOAA CCIEA Team to the Pacific Council on Sustainable Management

Editors: Dr. Chris Harvey (NWFSC), Dr. Toby C. Schumacher (NWFSC),
Dr. Nick Tolimieri (NWFSC), and Dr. David S. Secor (NWFSC)

1 INTRODUCTION

Section 1.4 of the 2013 Fishery Ecosystem Plan (FEP) provides the Council with a yearly update on the status of the ecosystem derived from environmental, biological and socioeconomic data. The Integrated Ecosystem Assessment (CCIEA) team prepared this report, with priority on the following topics:

The highlights of the report are as follows. In addition, Supplemental Information requests from Council members are available for additional information.

- Climate, ocean acidification, and sea level rise wave ("Blue Wave")

- Several ecosystem components

- The coastal upwelling system
- Some important fish and wildlife
- Sea lions
- There are many other components

- However, the ecosystem is not in a state of equilibrium

- Persistent low-level mortality
- Pyroclastic flows
- Juvenile salmon
- A major component of the ecosystem
- Reported by the Council
- Most recent data

- For the fishery, the biomass, and the ecosystem

- Social vulnerability and community

- We find some support for the hypothesis that the ecosystem is not in a state of equilibrium



Guiding Principle 6: Maintain resilient ecosystems

NOAA Fisheries recognizes that its mandates are intended to sustain resilient and productive living marine resource populations and habitats, to maintain overall structure and function, and to support the contributions that fisheries make to the socio-economic resiliency of human coastal communities. EBFM needs to develop operating protocols to maintain resilient ecosystem.







NOAA Fisheries Ecosystem-Based Fishery Management Western Road Map Implementation Plan (WRIP) – PUBLIC REVIEW DRAFT

The comment period on this PUBLIC REVIEW DRAFT ends **September 30, 2018**.
Comments may be sent via email to NOAA Fisheries: nmfs.westcoast-ebfm@noaa.gov.

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1.0 Introduction

In 2016, NOAA's National Marine Fisheries Service (NOAA Fisheries) released its [Ecosystem-Based Fisheries Management \(EBFM\) Policy and Road Map](#). For 2018 and beyond, the EBFM Road Map suggests that NOAA Fisheries develop regional Road Map implementation plans, to take into account the particular nature and challenges of each U.S. marine ecosystem. NOAA Fisheries' West Coast Regional Office, Northwest Fisheries Science Center, and Southwest Fisheries Science Center (collectively, NOAA Fisheries West Coast) together drafted this Western Road Map Implementation Plan (WRIP) for the California Current Ecosystem (CCE). This WRIP organizes key regional objectives, outlines progress in achieving them, and spells out future directions. While this document is in part about following the EBFM Road Map, it also lays important groundwork to strengthen future research, policy, and management decisions.



Unless indicated on image, all images are courtesy of the National Oceanic and Atmospheric Administration, except:

Slide 2: Boise, U.S. Bureau of Reclamation

Slide 4: Dirt road in Big Stone National Wildlife Refuge, USFWS

Slide 6: western coast of North America, NASA Goddard Space Flight Center; FEP cover image [repeated,] Blue Marble: Next Generation, Reto Stöckli, NASA Earth Observatory

Slide 15: stomach contents dissection, Joe Bizzarro, SWFSC

Slide 17: graphic model of California Current Integrated Socio-Ecological System, Su Kim, NWFSC; Harmful algal bloom, Washington Department of Ecology

Slide 18: Chippers in a shipyard, U.S. National Archives

